Agilent Technologies Noise Sources:
346C and N4002A
(All Serial Numbers)

Installation Note

Instructions for Setting Bias Current

Agilent Technologies

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A. Introduction

Due to a change of manufacturer of the noise diodes, adjustment of bias current is now necessary to ensure that the noise source performs within its specified ENR range. This document is supplied with all the following replacement parts.

CAUTION: Repair or parts replacement of noise sources should NOT be attempted without full calibration capability and official field calibration software.

This Installation Note applies to the installation of the following replacement parts:

Table 1 Replacement Parts List

Model	Replacement Bulkhead	Replacement Noise Cartridge	Replacement PC Board Kit
346C	00346-60021	00346-60155	00346-60158
N4002A	N4002-60004	00346-60155	N4002-60005

The replacement bulkheads and cartridges listed in Table 1 are tested in the factory to determine the bias current level necessary to ensure that the product meets ENR specification.

For the 346C, bias levels are determined by installing the appropriate resistor value for R2 and R3 on the printed circuit board (Figure 1- 00346-60034). The appropriate resistors are supplied with the replacement part.

Replacement Bulkheads for the 346C have the recommended bias level written on the part. The appropriate resistors are enclosed in a small envelope. The resistors' value and part number are written on the envelope. The N4002A bulkheads are not be supplied with an envelope and resistor. However, the value of the current is marked on the part.

00346-60155 Replacement Noise Cartridges are used in both models. These parts will be labeled with a tracking number. The appropriate resistors will be enclosed in an envelope which is marked with the tracking number of the cartridge, resistor value, part number and recommended bias current level. Also, the cartridges are shipped with Installation Note 00346-90024, Attenuator Replacement, in case attenuator tuning is necessary to bring the unit to within specification.

For the N4002A model, the bias is set electronically by using field calibration software to calibrate the Noise Source and re-burn the EEPROM. The bias value of current supplied with the Replacement Noise Cartridge is to be used to program the sensor. The enclosed resistors are to be discarded.

A.1 346C Replacement Noise Cartridge Installation Instructions:

1. Ensure that the cartridge was shipped with two resistors of the same value contained in a small envelope.
2. Ensure that the tracking number on the cartridge matches the number on the envelope.

3. Ensure that the value of current marked on the envelope corresponds to the resistors value and part number provided (refer to Table 2).
4. Ensure that the resistor value on the envelope matches the resistors supplied.
5. Ensure that Installation Note 00346-90024 has been provided.
6. Disassemble the Noise Source using the procedure in the 346 Operating and Service manual, 00346-90139.
7. Remove the old cartridge and install the replacement cartridge.
8. Check the resistors installed in positions R2 and R3 on the 00346-60034 printed circuit board; refer to Figure 1- 00346-60034. Both resistors should be the same value. If the resistors installed match the resistors supplied, it is not necessary to replace them in the printed circuit board.
9. If necessary, install the supplied resistors in R2 and R3 position (refer to Figure 1- 00346-60034).
10. Reassemble the unit and do a preliminary ENR measurement.
11. If the ENR is not within specification, refer to the supplied 00346-90024 Installation Note for instructions on how to tune the attenuator to meet the ENR specification at frequencies above 12 GHz (polyiron adjustment has no effect on ENR below 2 GHz).
12. Retest ENR after tuning the attenuator.
13. If the ENR is still out of specification, substitute another pair of resistors for R2 and R3 from Table 2. Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz.
14. Retest ENR.

A.2 346C Replacement Bulkhead Assembly Installation Instructions:

1. Ensure that the bulkhead was shipped with two resistors of the same value contained in a small envelope.
2. Ensure that the value of current marked on the bulkhead matches the value on the envelope.
3. Ensure that the value of current marked on the envelope corresponds to the resistors' value and part number provided (refer to Table 2).
4. Ensure that the resistor value on the envelope matches the resistors supplied.
5. Disassemble the Noise Source using the procedure in the 346 Operating and Service manual, 00346-90139.
6. Remove the old bulkhead and install the replacement bulkhead.
7. Check the resistors installed in positions R2 and R3 on the 00346-60034 printed circuit board; please refer to Figure 1- 00346-60034. Both resistors should be the same value. If the resistors installed match the resistors supplied, it is not necessary to replace them in the printed circuit board.
8. If necessary, install the supplied resistors in the R2 and R3 positions (refer to Figure 1- 00346-60034).
9. Reassemble the unit and do a preliminary ENR measurement.
10. If the ENR is not in specification, substitute another resistor for R2 and R3 from Table 2. Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz.
11. Retest ENR.

A.3 346C Replacement Printed Circuit Board Assembly Installation Instructions:

1. Disassemble the Noise Source using the procedure in the 346 Operating and Service manual, 00346-90139.
2. The value of R2 and R3 on the replacement printed circuit board will probably be 287 ohms. Use the resistors supplied, install the same value of R2 and R3 as in the printed circuit board being replaced.
3. Install the replacement printed circuit board, reassemble the unit and do a preliminary ENR measurement.
4. If the ENR is not meeting specification, substitute another resistor for R2 and R3 from Table 1. Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz.
5. Retest ENR.

A.4 N4002A Replacement Noise Cartridge Installation Instructions:

1. Ensure that the cartridge was shipped with a small envelope.
2. Ensure that a value of current is marked on the envelope (the resistors will not be used).
3. Ensure that Installation Note 00346-90024 has been provided.
4. Disassemble the Noise Source using the procedure in the SNS Series Operating and Service Guide, N4000-90001.
5. Remove the old cartridge and install the replacement cartridge.
6. Using the field calibration software, set the bias current to the value on the envelope (in mA). Discard the resistors enclosed.
7. Reassemble the unit and do a preliminary ENR measurement.
8. If the ENR is not within specification, refer to the supplied 00346-90024 Installation Note for instructions on how to tune the attenuator to meet the ENR specification at frequencies above 12 GHz.
9. Retest ENR after tuning the attenuator.
10. If the ENR is not meeting specification, use the field calibration software to reprogram the bias current using the values from Table 2. Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz
11. Retest ENR.

A.5 N4002A Replacement Bulkhead Assembly Installation Instructions:

1. Ensure that a value of current is marked on the replacement bulkhead.
2. Disassemble the Noise Source using the procedure in the SNS Series Operating and Service Guide, N4000-90001.
3. Remove the old bulkhead and install the replacement bulkhead.
4. Using the field calibration software, set the bias current to the value on the bulkhead (in mA).
5. Reassemble the unit and do a preliminary ENR measurement.
6. If the ENR is not meeting specification, use the field calibration software to reprogram the bias current using the values from Table 2. Decreasing the bias current by 10% increases the ENR response by 0.5dB at 10MHz

7. Retest ENR.

A.6 N4002A Replacement Printed Circuit Board Assembly Installation Instructions:

1. Using the field calibration software, determine the bias current applied to the noise diode.
2. Disassemble the Noise Source using the procedure in the SNS Series Operating and Service Guide, N4000-90001.
3. Install the replacement printed circuit board.
4. Reassemble the unit.
5. Using the field calibration software, set the bias current to the original value
6. Perform a preliminary ENR measurement.
7. If the ENR is not in specification, use the field calibration software to change the bias setting. Refer to Table 2 for bias current values. Decreasing the bias current increases the ENR response.
8. Retest ENR.

A.7 Printed Circuit Board Assembly Graphic and Resistor List

Table 2 Parts List

Current (mA)	R2 and R3 Ohms	R2 and R3 Part Number
38.3	287	0698-7223
34.8	316	0698-7224

Figure 1- 00346-60034